

1. (Amended) A work chucking/inserting apparatus for chucking a work, for aligning the work with an insertion hole and for inserting the work into the insertion hole, said apparatus comprising:

three or more chuck fingers,

said chuck fingers being arranged in circumferentially spaced positions around a central axis and slidably mounted for advancing and retreating linearly and radially relative to said central axis,

inner surfaces of said chuck fingers serving as chuck surfaces for chucking the work, and outer surfaces of said chuck fingers being tapered at least at tip end portions thereof, tapering inward toward said central axis approaching the tips, for contact with an inlet of the insertion hole; and

drive means for advancing and retracting said chuck fingers linearly and radially relative to said central axis.

✓ 2. (Amended) A work chucking/inserting apparatus for chucking a work, for aligning the work with an insertion hole and for inserting the work into the insertion hole, said apparatus comprising:

three or more chuck fingers,

said chuck fingers being arranged in circumferentially spaced positions around a central axis and slidably mounted for advancing and retreating linearly and radially relative to said central axis,


inner surfaces of said chuck fingers serving as chuck surfaces for chucking the work, and

outer surfaces of said chuck fingers having at least at tip end portions thereof surfaces extending parallel to said central axis for contact with an inlet of the insertion hole; and

tracer means for, when the outer surfaces of said chuck fingers come into contact with the inlet of the insertion hole, reorienting said apparatus to bring said central axis into alignment with a central axis of the insertion hole.

3. (Amended) A work chucking/inserting apparatus for chucking a work, for aligning the work with an insertion hole and inserting the work into the insertion hole, said apparatus comprising:

three or more chuck fingers and three or more hole position detecting fingers,

 said chuck fingers being arranged in circumferentially spaced positions around a central axis and slidably mounted for advancing and retreating linearly and radially relative to said central axis,

said hole position detecting fingers being arranged in circumferentially spaced positions and pivotable inwards and outwards relative to said central axis, about pivot points on base end portions thereof,

inner surfaces of said chuck fingers serving as chuck surfaces for chucking the work, and outer surfaces of said hole position detecting fingers being tapered at least at tip end portions thereof, tapering inward toward said central axis approaching the tips, for contact with an inlet of the insertion hole; and

drive means for advancing and retracting said chuck fingers linearly and radially relative to said central axis.

5. (Amended) A work chucking/inserting apparatus according to claim 3, wherein the base end portions of said hole position detecting fingers are pivotally connected to a base portion, said base portion supporting said chuck fingers for radial advance and retreat.

8. (Twice Amended) A work chucking/inserting apparatus according to claim 1, wherein the inlet of the insertion hole is chamfered, and the tip end portions of said chuck fingers are respectively formed with projections which mate with the chamfered portion when the work is inserted into the insertion hole.

9. (Twice Amended) A work chucking/inserting apparatus according to claim 1, wherein the work is a piston or an assembly of a piston and a connecting rod, and the insertion hole is a cylinder bore.

10. (Amended) A work chucking/inserting apparatus according to claim 3, wherein the work is an assembly of a piston and a connecting rod, the insertion hole is a cylinder bore, said chuck fingers chuck said piston, and said hole position detecting fingers also serve as means for chucking said connecting rod.


11. (Amended) A work chucking/inserting apparatus for chucking a work, for aligning the work with an insertion hole and for inserting the work into the insertion hole, said apparatus comprising:

three or more chuck fingers,

said chuck fingers being arranged in circumferentially spaced positions around a central axis and slidably mounted for advancing and retreating linearly and radially relative to said central axis,

inner surfaces of said chuck fingers serving as chuck surfaces for chucking the work and each having a portion tapering inward toward said central axis approaching a distal end thereof,

outer surfaces of said chuck fingers being tapered at least at tip end portions thereof, tapering inward toward said central axis approaching the tips, for contact with an inlet of the insertion hole,

 tracer means for, when the outer surfaces of said chuck fingers come into contact with the inlet of the insertion hole, reorienting said apparatus to bring said central axis into alignment with a central axis of the insertion hole, and

pushing means for pushing the work toward the insertion hole.

12. (Amended) A work chucking/inserting apparatus according to claim 11, wherein the inlet of the insertion hole is chamfered, and the tips of the outer surfaces of said chuck fingers are shaped to mate with the chamfered portion when the work is inserted into the insertion hole.

13. (Amended) A work chucking/inserting apparatus for chucking a work, for aligning the work with an insertion hole and for inserting the work into the insertion hole, the insertion hole having a chamfered inlet, said apparatus comprising:

three or more chuck fingers,

said chuck fingers being arranged in circumferentially spaced positions around a central

axis and slidably mounted for advancing and retreating radially,

inner surfaces of said chuck fingers serving as chuck surfaces for chucking the work and each having a portion tapering inward toward said central axis approaching a distal end thereof,

end faces of said distal ends of said chuck fingers being at least partially flat for coming into abutment against a wall surface which surrounds an inlet of the insertion hole,

outer surfaces of said chuck fingers having at least at tip end portions thereof surfaces extending parallel to said central axis for contact with an inlet of the insertion hole,

portions close to inner peripheral edges of the end faces of said chuck fingers mating with the chamfered portion of the inlet of said insertion hole when said work is inserted into said insertion hole,

tracer means for, when the outer surfaces of said chuck fingers come into contact with the inlet of the insertion hole, reorienting said apparatus to bring said central axis into alignment with a central axis of the insertion hole, and

pushing means for pushing said work toward the insertion hole.


14. (Twice Amended) A work chucking/inserting apparatus according to claim 11, wherein the work is a piston or an assembly of a piston and a connecting rod, and the insertion hole is a cylinder bore.

15. (Twice Amended) A work chucking/inserting apparatus according to claim 11, wherein said pushing means includes a vacuum chuck for holding the work.

Please add the following new claims:

-17. A work chucking/inserting apparatus according to claim 1 wherein said drive means comprises a motor.

18. A work chucking/inserting apparatus according to claim 3 wherein said drive means comprises a motor.

 19. A work chucking/inserting apparatus for chucking a work, for aligning the work with an insertion hole and for inserting the work into the insertion hole, said apparatus comprising:

three or more chuck fingers,

said chuck fingers being arranged in circumferentially spaced positions around a central axis and slidably mounted for advancing and retreating linearly and radially relative to said central axis,

inner surfaces of said chuck fingers serving as chuck surfaces for chucking the work, and

outer surfaces of said chuck fingers being tapered at least at tip end portions thereof, tapering inward toward said central axis approaching the tips, for contact with an inlet of the insertion hole; and

tracer means for, when the outer surfaces of said chuck fingers come into contact with the inlet of the insertion hole, reorienting said apparatus to bring said central axis into alignment with a central axis of the insertion hole.


20. A work chucking/inserting apparatus for chucking a work, for aligning the work with an insertion hole and for inserting the work into the insertion hole, said apparatus comprising:

three or more chuck fingers,

said chuck fingers being arranged in circumferentially spaced positions around a central axis and slidably mounted for advancing and retreating linearly and radially relative to said central axis,

inner surfaces of said chuck fingers serving as chuck surfaces for chucking the work, and

outer surfaces of said chuck fingers having at least at tip end portions thereof surfaces extending parallel to said central axis for contact with an inlet of the insertion hole; and

 drive means for advancing and retracting said chuck fingers linearly and radially relative to said central axis.

21. A work chucking/inserting apparatus for chucking a work, for aligning the work with an insertion hole and inserting the work into the insertion hole, said apparatus comprising:

three or more chuck fingers and three or more hole position detecting fingers,

said chuck fingers being arranged in circumferentially spaced positions around a central axis and slidably mounted for advancing and retreating linearly and radially relative to said central axis,

said hole position detecting fingers being arranged in circumferentially spaced positions and pivotable inwards and outwards relative to said central axis, about pivot points on base end portions thereof,

inner surfaces of said chuck fingers serving as chuck surfaces for chucking the work, and

outer surfaces of said hole position detecting fingers being tapered at least at tip end portions thereof, tapering inward toward said central axis approaching the tips, for contact with an inlet of the insertion hole; and

tracer means for, when the outer surfaces of said chuck fingers come into contact with the inlet of the insertion hole, reorienting said apparatus to bring said central axis into alignment with a central axis of the insertion hole.

22. A work chucking/inserting apparatus according to claim 21, wherein the base end portions of said hole position detecting fingers are pivotally connected to the tip end portions of said chuck fingers.

23. A work chucking/inserting apparatus according to claim 21, wherein the base end portions of said hole position detecting fingers are pivotally connected to a base portion, said base portion supporting said chuck fingers for radial advance and retreat.

24. A work chucking/inserting apparatus according to claim 21, wherein the inlet of the insertion hole is chamfered, and the tips of the outer surfaces of said chuck fingers are shaped to mate with the chamfered portion when the work is inserted into the insertion hole.

25. A work chucking/inserting apparatus for chucking a work, for aligning the work with an insertion hole and for inserting the work into the insertion hole, said apparatus comprising:
three or more chuck fingers,